

REMARKS/ARGUMENTS

Claims 1, 10, 18, 30, 31, 51 and 52 have been amended. Claims 16 and 55 have been cancelled. Claims 15, 25-26 have been previously cancelled. New Claims 132-138 have been added. Claims 57-131 had been withdrawn as a result of an earlier restriction requirement. Claims 1-14, 17-24, 27-54, 56, and 132-138 remain in this application.

1. Claim Objections

The Patent Office has objected to Claims 6-10 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Patent Office asserts that Claim 1 (in light of the definitions of the Specification) requires that the doping atmosphere be provided into the vessel during the pulse (i.e. before the reaction time), but that Claim 10 requires that "the dopant gas" is not added to the atmospheres until after the pulse, and that in order for Claim 10 to be accurate, the pulse would require a pre-first doping atmosphere, then when it is in the vessel and the dopant gas added, then it would be a first doping as atmosphere which includes a dopant gas, and so Claim 10 does not further limit Claim 1, but Claim 10 changes the scope to something that is mutually exclusive of Claim 1. The Patent Office also asserts that Claim 6 requires the pressure staying constant through both reacting times, which means that the vessel be partially evacuated and refilled – thus it has to be made at least partially empty, and that Claim 6 thus changes the scope from one which the vessel is emptied (at least partially) to one that is never empty, such that these are mutually exclusive scopes, and so Claim 6 does not limit Claim 1, but takes it to a completely new scope..

The objection to Claim 6 is traversed.

Applicants submit that one or more gases other than a doping gas could be used to maintain total pressure in the vessel, such as inert gases, from the beginning of the first reacting time to the end of the second reacting time. As such, these gases can be added in a complementary, i.e. additional, fashion to the recited steps of Claim 1, and are not mutually exclusive. For example, see the Specification of the present Application at page 232 lines 3-15 and Fig. 12.

Applicants submit that the objection to Claim 10 is obviated by the foregoing amendment.

Accordingly, Applicants request that the objections be removed.

2. Claim Rejections Under 35 USC §112, First Paragraph

The Examiner has rejected Claims 1-5, 11-14, 16-24, and 27-56 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The Examiner asserts that the claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Patent Office asserts that Claim 51 first requires forming the doping atmosphere in the vessel, then later requires flowing the doping atmosphere into the vessel, and that there is no support for the recirculation of the doping atmosphere.

Applicants submit that the above rejection of Claim 51 under 35 U.S.C. 112, first paragraph has been obviated by the foregoing amendment to Claim 51 and request withdrawal of the rejection.

The Examiner also states that he could find no support for a pulse that has a flow through the vessel during the first reacting time as (now) required by Claim 1, wherein page 11 of the specification defines "pulsing" and Applicants are limited to that definition which requires that the pulsing is what happens prior to the reaction time, but Claim 1 (now) requires that the "pulse comprises a flow which is...(interrupted/reduced)...during the first reaction time.", and alternatively and/or additionally, there is no support of a pulse that comprises a flow of a doping atmosphere...as claimed. The Examiner further states that there is no support for the flow "through the vessel" that is fully or substantially reduced during the first reaction time/holding. Page 12, lines 17-19 of the specification limits what is meant by "hold" to having substantially no flow out of the vessel. And thus, nothing can go through the vessel. The Examiner states that the claim seems to be directed to both holding and pulsing, but that there does not appear to be any explicit support for this combination (and as per the definitions such seem impossible), and that most notably the specification defines/limits pulsing to the "process gas", and there is no support for pulsing only the doping atmosphere. The Examiner asserts that the above applies to Claims 30 and 51 as well.

In view of the claims as amended, the rejection is traversed.

The Specification of the present Application at page 2, lines 12-13 states "This pulsing of dopant atmospheres is referred to herein as "pulsed doping."

Furthermore, the Specification at page 11 lines 17-22 refers to "pulsing":

By "pulsing", it is meant that a mass or batch of the process gas is flowed into the chamber 114 prior to the beginning of the corresponding reacting time t_R , and the flow into the chamber 114 is then interrupted such that *flow of process gas through the chamber 114 is fully or substantially reduced throughout the reacting time t_R* as compared to the flow of process gas through the chamber 114 before and after the reacting time t_R . [Emphasis added]

The Specification at page 2 line 27 states that "The process gas includes a doping gas" and the Specification at page 3 lines 26-27 states "A supply of process gas including at least one of a dopant gas and a drying gas is provided.". Thus, the process gas, as used in the Specification, could generally include a dopant gas, or a drying gas, or both.

Also, in the Specification on page 12 lines 17-19, "hold" or "held" (as in, e.g. "holding the first doping atmosphere") "... means that there is *no substantial flow* of

the atmosphere 160 out of the chamber 114 for a finite period of time (*i.e.*, the reacting time t_R) as would occur in the case of a traditional gas flow-through process.”

In some embodiments (for example Specification page 17 lines 16-22), a pressure vessel is “preferably sealed gas-tight throughout the *per pulse* reacting time t_R ”, although it is contemplated that “enhanced sealing arrangements may be provided to the apparatus 100 and/or decreased leakage rates may be allowed, high-pressure doping apparatus such as the apparatus 200 of Fig. 4 are preferred for doping the preform 5 at pressures significantly exceeding ambient pressure. According to certain preferred embodiments, the doping atmosphere 160 is *held* (as defined above) in the chamber 114 throughout the reacting time t_R .” (emphases added)

Applicants submit that Claims 1, 30, and 51, as amended, are supported by the Specification, and request withdrawal of the rejections.

3. Claim Rejections Under 35 U.S.C. §112, Second Paragraph

The Examiner has rejected Claims 1-5, 11-14, 16-24, and 27-56 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Regarding Claim 18, the Examiner states that there is confusing antecedent basis for “the reacting time” – it being unclear if it is the second, first or both, and the same for “the doping atmosphere”.

Applicants submit that the foregoing amendment to Claim 18 obviates the rejection and request withdrawal of the rejection.

Applicants further submit that foregoing amendments to Claims 1, 30 and 51 are clear with respect “pulsing” and to flow out of the chamber during the reacting time.

Claims 30 and 51 are indefinite for the same reasons Claim 1 is.

The Examiner states that Claim 51 is not understood, lines 3-4 requires that the doping atmosphere is formed in the vessel – but line 9 requires that the doping atmosphere flows into the vessel.

Applicants submit that the above rejection of Claim 51 under 35 U.S.C. 112, second paragraph has been obviated by the foregoing amendment to Claim 51 and request withdrawal of the rejection.

Regarding Claim 52, Applicants submit that the foregoing amendment to Claim 52 obviates the rejection and request withdrawal of the rejection.

4. Claim Rejections Under 35 U.S.C. §103

The Examiner has rejected Claims 1-5, 11-14, 16-24 and 27-50 under 35 U.S.C. 103(a) as being unpatentable over Ikuta 6499317. The Examiner points to Col. 13, lines 25-37 for disclosing pulsed doping substantially as claimed. The Examiner further asserts that Ikuta does not explicitly say that there is evacuating step as claimed, but Col. 13, line 23 substantially supplies this lack by saying that the process can have more fluorine doping. The Examiner states that there is no indication as to how do the "more" doping, but it would have been obvious to do more doping by repeating the same "fluorine doping" described at Col 13, lines 25-37, and that performing the Ikuta fluorine doping twice would result in the two pulsings of SiF₄, namely providing the pulse/atmosphere, holding at the normal pressure for a predetermined time to dope, reducing the pressure (i.e. evacuating) to 1 Torr again, refilling with SiF₄, and holding again.

In view of the claims as amended, the rejection is traversed. Applicants submit that Ikuta does not teach or suggest holding the preform in a doping atmosphere which is kept at a pressure higher than ambient. Moreover, Ikuta teaches away from same at the cited col. 13 lines 25-37 by teaching an inert gas at normal pressure in its container, then reducing that pressure to a level of 1 Torr, and only then introducing a dopant gas (SiF₄) and holding the preform.

Accordingly, Applicants submit that independent claims 1, 30, and 51, as well as their dependent claims, as amended, are not unpatentable over Ikuta for at least the above reasons and request withdrawal of the rejection.

5. Conclusion

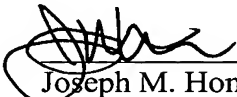
Based upon the above amendments, remarks, and papers of records, Applicants believe the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Applicants believe that no extension of time is necessary to make this Reply timely. Should Applicant be in error, Applicants respectfully request that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorize the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Joseph M. Homa at 607-974-9061.

Respectfully submitted,

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Joseph M. Homa
Attorney for Assignee
Registration Number: 40,023
Corning Incorporated
SP-TI-03-1
Corning, NY 14831
Phone: 607-974-9061